

## Math 1060 – Exam 2 Review

**Use identities to simplify each expression:**

1.  $\frac{\tan x \csc x}{\sec x}$

2.  $\tan^2 x - \frac{\sin(-x)}{\sin x}$

**Multiply and simplify:**

3.  $\sin \theta \cos \theta (\tan \theta + \cot \theta)$

**Factor and simplify:**

4.  $\sin^2 x \tan^2 x + \sin^2 x$

**Verify each identity:**

5.  $\frac{\sin x \cos x}{\tan x} = 1 - \sin^2 x$

6.  $\cot(-x) = \frac{1 - \sin^2 x}{\cos(-x) \sin(-x)}$

7.  $\frac{\sin 2\beta}{2 \csc \beta} = \sin^2 \beta \cos \beta$

8.  $\frac{1}{\sec \theta - 1} - \frac{1}{\sec \theta + 1} = 2 \cot^2 \theta$

9.  $\cos(3x) = \cos x (1 - 4 \sin^2 x)$

10.  $\sin^2\left(\frac{x}{2}\right) = \frac{\csc^2 x - \cot^2 x}{2 \csc^2 x + 2 \csc x \cot x}$

**Use identities to find the exact values of the remaining five trigonometric functions at  $\alpha$ .**

11.  $\cos \alpha = \frac{1}{\sqrt{5}}$  and  $\alpha$  is in quadrant IV.

**Find the exact value by using a sum or difference identity:**

12.  $\cos\left(\frac{7\pi}{12}\right)$

13.  $\sin\left(\frac{\pi}{12}\right)$

14.  $\tan 165^\circ$

**Use the sum/difference identities to simplify each expression.**

15.  $\cos 75^\circ \cos 60^\circ - \sin 75^\circ \sin 60^\circ$

16.  $\sin 80^\circ \cos 50^\circ - \cos 80^\circ \sin 50^\circ$

17. Find  $\sin(A + B)$  if  $\sin A = -5/13$  and  $\cos B = 2/5$ , with  $A$  in quadrant III and  $B$  in quadrant I.

18. Find  $\cos(\alpha - \beta)$  if  $\sin \alpha = 15/17$  and  $\sin(\beta) = -1/3$ , with  $\alpha$  in quadrant II and  $\beta$  in quadrant IV.

**Find the exact value by using a half-angle identity.**

19.  $\sin\left(-\frac{\pi}{8}\right)$

20.  $\tan\left(\frac{3\pi}{8}\right)$

**Use the given information to find the exact value of the trigonometric function.**

21. Find  $\cos\left(\frac{\alpha}{2}\right)$  if  $\cos \alpha = \frac{1}{4}$ , and  $\alpha$  is in quadrant IV.

22. Find  $\sin 2\theta$  if  $\sin \theta = \frac{5}{13}$ , and  $\theta$  is in quadrant II.

**Find the exact value without using a calculator.**

23.  $\cos^{-1}\left(-\frac{1}{2}\right)$

24.  $\arctan(1)$

25.  $\sec^{-1}\left(\frac{2\sqrt{3}}{3}\right)$

**Find the exact value in degrees without using a calculator.**

26.  $\csc^{-1}(-\sqrt{2})$

27.  $\arcsin\left(\frac{1}{2}\right)$

28.  $\cot^{-1}(-\sqrt{3})$

**Find the approximate value using a calculator.**

29.  $\sec^{-1}(-1.5643)$

**Find all values for  $x$  in the interval  $[0, 2\pi]$  that satisfy the equation.**

30.  $\tan(x) = \sqrt{3}$

**Find the exact value of the composition.**

31.  $\csc\left(\cos^{-1}\left(\frac{5}{13}\right)\right)$

32.  $\cos\left(\arctan\left(\frac{8}{15}\right)\right)$

**Find an equivalent algebraic expression for the composition.**

33.  $\tan(\arccos(x))$

34.  $\sec(\arcsin(x))$

**Find the acute angle  $\theta$ , to the nearest hundredth of a degree for the given function value.**

35.  $\csc \theta = 6.354$

36.  $\sec \theta = 4.321$

**Find all real numbers that satisfy the equation.**

37.  $2\cos x + \sqrt{3} = 0$

**Find all real numbers in the interval  $[0, 2\pi)$  that satisfy the equation.**

38.  $\sqrt{2}\sin(3x) = 1$

**Find all real numbers that satisfy the equation.**

39.  $2\cos^2 x = \cos x$

**Find all angles in the interval  $[0^\circ, 360^\circ)$  that satisfy the equation.**

40.  $2\sin x \cos x = 1$